



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/609,153	06/24/2003	Husayn Alvarez-Gomariz	303.854US1	7883
21186	7590	11/23/2005	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH				KIK, PHALLAKA
1600 TCF TOWER				
121 SOUTH EIGHT STREET				
MINNEAPOLIS, MN 55402				
				ART UNIT
				PAPER NUMBER
				2825

DATE MAILED: 11/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/609,153	ALVAREZ-GOMARIZ ET AL.	
	Examiner	Art Unit	
	Phallaka Kik	2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 07 November 2005 and 24 June 2003.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-32 is/are pending in the application, *wherein claims 33-61 are canceled.*
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-32 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 24 June 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____.
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____.

DETAILED ACTION

1. This Office Action responds to Applicant's amendment and response to the election/restriction and amendment filed on 11/7/2005, and application filed on 6/24/2003. Claims 1-32 are pending, wherein claims 33-61 have been canceled.

Election/Restrictions

2. Applicant's election without traverse of claims 1-32 in the reply filed on 11/7/2005 is acknowledged, wherein Applicant's cancellation of claims 33-61, as being directed to non-elected inventions, is also acknowledged.

3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Oath/Declaration

4. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:
"an original, first an joint inventor" is misspelled and should be --an original, first and joint inventor--

Specification

5. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the

abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The abstract of the disclosure is objected to because it does not provide clear and concise statement of the technical disclosure or improvement thereof, wherein Applicant's abstract merely discusses the advantages/benefits of Applicant's invention (i.e., refers to purported merits or speculative applications of the invention and

comparison of the invention with the prior art), without providing, by way of example, the concise and clear details of the preferred modification(s) or alternative(s) (i.e., as claimed in claims 1, 8, 15, 21 and 27) so as to describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details. Correction is required. See MPEP § 608.01(b).

Claim Objections

7. **Claims 21-32** are objected to because of the following informalities:

As per **claims 21 and 27**, "the pattern" (lines 3 and 5 respectively) should be --a pattern-- for proper antecedent basis

As per **claims 22-26,28-32**, the claims are objected to for incorporating the above errors into the respective claims by claim dependency. Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. **Claims 1-3,5-8,10-15,17-18,21-32** are rejected under 35 U.S.C. 102(b) as being anticipated by **Ludwig et al.** (PCT Publication No. WO 200209152 A2, published January 31, 2002, with English equivalent as translated in U.S. Patent Application Publication No. 2003/0140331).

*Applicant should note that, for the rejections given in this section below, all references to **Ludwig et al.**, above, are made to the U.S. document 2003/0140331 since this document is the English translation equivalent of WO 200209152 A2 document (which was published in the German language), as evidenced by claim of continuation of PCT application No. PCT/DE01/02878 (published as document No. WO 200209152 A2) in the U.S. document 2003/0140331 (see front page) (see also Derwent Patent Family sheet).*

As per **claims 1,21,27**, all of the elements of the claims are discussed in **Ludwig et al.** (U.S. Patent Application Publication No. 2003/0140331), paragraphs [0072]-[0073] and Figs. 5A and 5B; wherein the region identified or determined corresponds to the critical region 2 (see Fig. 5A and paragraph [0072]); wherein the at least one feature corresponds to the overlap region 13 or the feature contained in the overlap region 13 (see Fig. 5B and paragraph [0073]); wherein the subtraction of feature (i.e., overlap region 13 or feature contained in the overlap region) from the identified or determined region (i.e., critical region 2) is discussed in paragraph [0073], wherein such ring-like region is illustrated in Fig. 5B in which there would be a hole left-over by the removal of overlap region 13, which is surrounded by critical region 2, on two-dimensional plane as illustrated in Figs. 5A and 5B; wherein such analyzing the optical behavior (i.e., phase conflict) and optical interactions prediction are also described in paragraphs [0073] and [0069]; wherein the method of checking data is described in the abstract for which the data is in a two-dimensional pattern (i.e., patterns such as overlap region, critical region, etc., illustrated in Figs. 5A and 5B are on two-dimensional plane); wherein since the

method is a computer-implement method (see paragraphs [0013]-[0015]), processor, the machine-readable medium or memory with instructions stored thereon for such execution, are inherently included as being necessary to implement the computer-implemented method.

As per **claims 2-3,22-23,28-29**, all of the elements of claims 1,21,27, from which the respective claims depend, are discussed in the rejection of claims 1,21,27 above, wherein the sizing up of the feature by a given distance is also described in paragraphs [0076] and [0087], wherein the optical ambit is defined in Applicant's specification as the distance beyond which no optical interactions are observed between features (Applicant's specification, page 9, lines 10-13) and since the distance is expandable or stretchable such that no optical interactions are observed (i.e., critical region no longer contain overlap region--paragraphs [0076]-[0078]), this limitation is further met.

As per **claims 5,24,30**, all of the elements of claims 1,21,27, from which the respective claims depend, are discussed in the rejection of claims 1,21,27 above, wherein the predicting of the optical interference that forms at least one additional feature in a given lithographic process is also part of the phase conflict analysis as further described in paragraph [0009].

As per **claims 6,25,31**, all of the elements of claims 5,24,30, from which the respective claims depend, are discussed in the rejection of claims 5,24,30 above, wherein predicting the location of the additional feature in the given lithographic process is also part of the phase conflict analysis to determine the problem location(s) as further discussed in paragraphs [0009]-[0010].

As per **claims 7,26,32**, all of the elements of claims 6,25,31, from which the respective claims depend, are discussed in the rejection of claims 6,25,31 above, wherein predicting the size and shape is also described in paragraph [0076] and [0080].

As per **claims 8,15**, the organizing of the data into a two dimensional pattern of features are illustrated in Figs. 5A, 5B wherein the patterns such as overlap region, critical region, etc., are shown on a two-dimensional plane, which are determined or organized as described in paragraphs [0066]-[0069]; wherein the data checking steps (identification, subtraction, analyzing) are discussed in the rejection of claims 1,21,27 above; wherein the further organizing of data into the at least one modifying feature is also discussed in paragraph [0010] from which the results of the analysis (i.e., phase conflict resolution) are applied; and wherein printing and forming of the two dimensional pattern and of the modifying features are part of the image projection as described in paragraph [0015] for which the method/system of **Ludwig et al.** is intended.

As per **claims 10-11,17-18**, all of the elements of claims 8 and 15 are discussed in the rejection of claims 8,15 above, from which the respective claims depend, wherein the sizing up the feature by a given distance is also described in paragraphs [0076] and [0087]; and wherein the optical ambit is defined in Applicant's specification as the distance beyond which no optical interactions are observed between features (Applicant's specification, page 9, lines 10-13) and since the distance is expandable or stretchable such that no optical interactions are observed (i.e., critical region no longer contain overlap region--paragraphs [0076]-[0078]), this limitation is further met.

As per **claims 12-14**, all of the elements of claim 10 are discussed in the rejection of claim 10 above, from which the respective claims depend, wherein the further limitations of the claims are discussed in the rejections of claims 5-7 above.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. **Claims 4,9,16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ludwig et al.** (PCT Publication No. WO 200209152 A2, published January 31, 2002, with English equivalent as translated in U.S. Patent Application Publication No. 2003/0140331) in view of **Broeke et al.** (U.S. Patent Application Publication No. 2004/0209170).

As per **claim 4**, **Ludwig et al.** disclose all of the elements of claim 1, from which the claim depends, as discussed in the rejection of claim 1 above. However, **Ludwig et al.** failed to specifically teach the three dimensional analysis affecting patterns within the two-dimensional ring-like region. **Broeke et al.** teach the optical analysis involving three-dimensional optical analysis affecting the two-dimensional patterns to ensure that areas of constructive and destructive interferences are accounted for (see paragraphs [0060], [0065]). It would have been obvious to one of ordinary skilled in the art at the

time of the invention to further perform three dimensional analysis affecting patterns within the two-dimensional areas as taught by **Broeke et al.** for the ring-like regions of **Ludwig et al.** because such analysis would account for all areas of constructive and destructive interferences.

As per **claims 9,16, Ludwig et al.** disclose all of the elements of claims 8 and 15, from which the respective claims depend, are discussed in the rejections of claims 8 and 15 above. However, **Ludwig et al.** failed to specifically teach the organizing data into at least one sub printing lithographic aperture. Such printing/sub-printing of lithographic aperture for which the corresponding organized data is taught by **Broeke et al.** for proper patterns exposure to produce the desired integrated circuit (see paragraph [0038]). It would have been obvious to one of ordinary skilled in the art at the time of the invention to further incorporate the teachings of **Broeke et al.** into the system/method of **Ludwig et al.**, because such incorporation would provide for proper patterns exposure to produce the desired integrated circuit, as intended by **Ludwig et al.**.

12. **Claims 19-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ludwig et al.** (PCT Publication No. WO 200209152 A2, published January 31, 2002, with English equivalent as translated in U.S. Patent Application Publication No. 2003/0140331) in view of **Jin** (U.S. Patent Application Publication No. 2005/0051873).

As per **claims 19-20, Ludwig et al.** disclose all of the elements of claims 15, from which the claims depend, are discussed in the rejection of claim 15 above. However, **Ludwig et al.** failed to teach specifically the use of UV and X-ray wavelengths

energy sources as part of the forming of the two dimensional pattern of features. **Jin** teaches such use of UV and X-ray wavelength energy sources are commonly used in the art for forming a pattern of features on the semiconductor substrate, including in conjunction with the use of phase shifting masks (paragraph [0035]). It would have been obvious to one of ordinary skilled in the art at the time of the invention to further incorporate the teachings of **Jin** in using of the UV and X-ray wavelength energy sources for forming the two dimensional pattern of features of **Ludwig et al.** because such wavelength energy sources are commonly used in the art for forming a pattern of features on the semiconductor substrate, for which the method/system of **Ludwig et al.** is intended (see **Ludwig et al.**, paragraphs [0003]-[0004]).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Therefore, Applicant is requested herein to consider them carefully in response to this Office Action. In particular, the following prior arts made of record are most relevant:

Butschke et al. (US Patent Application Publication No. 2002/0182895, especially paragraphs [0002], [0008], [0016]);

Takeuchi (US Patent Application Publication No. 2003/0148195, especially paragraphs [0003], [0043], [0049], [0050], [0057]);

Butschke et al. (US Patent Application Publication No. 2002/0182895, especially paragraphs [0002], [0008], [0016], [0021]).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phallaka Kik whose telephone number is 571-272-1895. The examiner can normally be reached on Monday-Thursday, 6:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any response to this action should be mailed to:

Commissioner for Patents

P. O. Box 1450

Alexandria, VA 22313-1450

or faxed to:

571-273-8300



Phallaka Kik
U.S. Patent Examiner
November 17, 2005